

- a. Project Title: Mallard Slough Intake Relocation and Habitat Restoration Project
Applicant Name: Contra Costa Water District, 2300 Stanwell Drive, Suite A, Concord, CA 94524

b. Project Description: The Mallard Slough Intake Relocation and Habitat Restoration Project consists of several elements that are proposed to be added to the scope of the Mallard Slough Pump Station Replacement Project. Contra Costa Water District (District) plans to fund the replacement of a 60 year old, unscreened, raw water pump station with a new pumping facility equipped with state-of-the-art fish screens. The District is applying for CALFED funding for the Mallard Slough Intake Relocation and Habitat Restoration Project only. This intake relocation and habitat restoration project will include an intake suction line extension to the Sacramento River from the southern end of Mallard Slough. Additionally, in the vicinity of Mallard Slough, specific restorative and enhancement measures will be made to aquatic and wetland habitats.

Primary Biological/Ecological Objectives: The objective of the Mallard Slough Intake Relocation and Habitat Restoration Project is to reduce potential impacts on fisheries and improve the wetland habitat adjacent to the slough. Mallard Slough extends due south from the Sacramento River for approximately 3000 feet in the area of Chipps Island (see Location Map - Attachment A). The slough varies in width from 40 to 60 feet and ranges from 6 to 10 feet in depth. The shores of Mallard Slough support thriving wetland habitats with pockets of degraded wetlands resulting from alterations to the area's natural hydrology. Study of the aquatic habitat has shown that the slough is frequented by several listed species (e.g. Delta smelt) and species of management concern (e.g. Sacramento splittail, winter-run chinook salmon). The existing pump station has the potential to draw fish to the end of the slough leaving them vulnerable to predation. The intake relocation would minimize this potential impact on fisheries. In addition, the degraded wetland areas along the slough would be restored improving water quality and the value of wetland habitats.

- c. Approach/Tasks: The Mallard Slough Intake Relocation and Habitat Restoration Project will focus on two primary efforts:

Pump Intake Suction Line Extension: It is proposed that the specific intake location for the Mallard Slough Pump Station be moved from its current location (at the southern end of the slough) to a location within the Sacramento River. This may be accomplished by installing an extension pipe (approximately 3000 feet) from the pump station location along the length of the slough to the river channel (see Intake Pipeline Alternatives - Attachment A). This extension pipe will be equipped with intake screens and will allow pump station flows to be diverted from the river itself instead of from the end of Mallard Slough.

The purpose of the intake suction pipe extension is to reduce impacts on sensitive fish species by placing the intake in a location with significantly higher sweeping velocities and higher flow volumes. It is believed that the current end-of-slough location has the potential to draw fish towards the intake leading to possible disorientation and greater susceptibility to predation. Establishing the diversion point in an area of higher flows would reduce the relative impact on flow conditions in the vicinity of the intake, thereby minimizing the adverse effects on fisheries resources.

Habitat Restoration: A variety of restorative measures are planned as a part of this project for the aquatic and wetland habitats of Mallard Slough. Some wetland areas adjacent to the slough are degraded due to alterations to the natural hydrology and from the development of the area as a railroad and utility corridor. The proposed project will restore natural flow patterns and will establish native vegetation to enhance these valuable habitats.

Schedule: The Mallard Slough Pump Station Replacement Project is scheduled for construction in the spring of 2000 (see Project Schedule - Attachment B). It is proposed that the intake suction pipe extension be installed as a part of the replacement project and that specific habitat restorative efforts be made following the construction period in the summer of 2001.

d. Justification for Project and Funding by CALFED: The Mallard Slough Intake Relocation and Habitat Restoration Project will improve and expand both aquatic and wetland habitats benefiting particularly fisheries, birds and other wetland inhabitants.

CALFED is charged as a steward for the species and habitats of the Bay-Delta. Mallard Slough is in an area within the region that currently supports diverse plant and animal species. The District believes that a part of its role as a user of the slough area is to sustain the surrounding habitat and encourages CALFED to join in this effort.

e. Budget Costs and Third Party Impacts: Preliminary cost estimates for the Mallard Slough Intake Relocation and Habitat Restoration Project indicate that the intake suction pipe extension will add between \$750,000 and \$1.5 million to the pump station replacement project, depending on pipe material and installation techniques. A possible lower cost option, with potentially less impact on wetlands, is a barge-based installation of twin 36" high-density polyethylene (HDPE) pipes anchored to the bed of the slough from the pump station to the Sacramento River (see In-Slough Alternative - Attachment A). The cost of habitat restoration for the slough area greatly varies, depending on the extent of levee modifications and whether land acquisition is required. This application for CALFED funding is for the construction of the pipe extension and for habitat restoration; operation and maintenance of all facilities will be funded solely by the District. The District knows of no third parties that are adversely affected by the project, at this time.

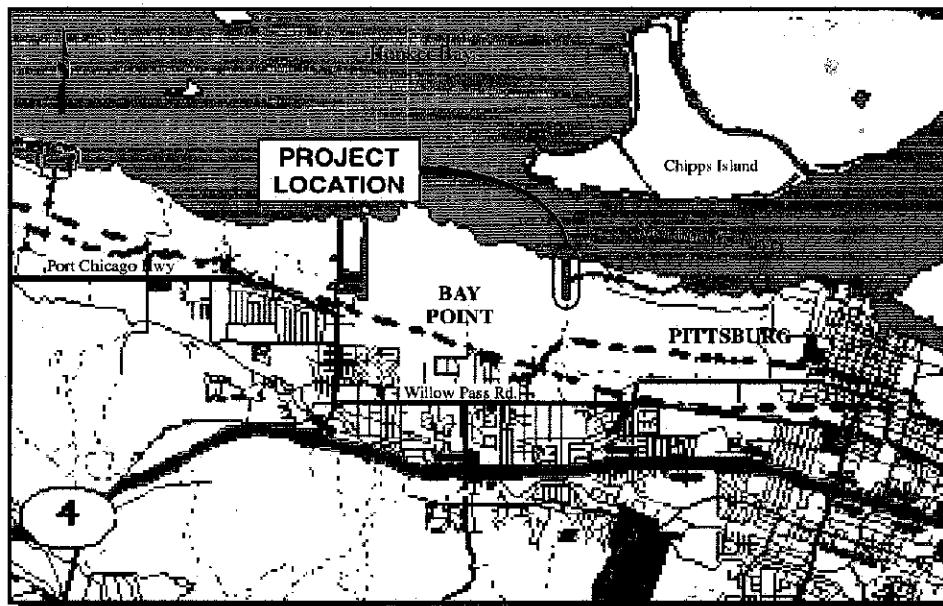
f. Applicant Qualifications: The District is a special utility district created under the County Water District Law. The District provides drinking water to approximately 400,000 residential customers, and raw water supply to numerous industrial and irrigation users. The District has no conflict of interest related to this inquiry.

g. Monitoring and Data Evaluation: In 1996, the District conducted a fish monitoring program in the Mallard Slough area. The findings of this program are shown in Attachment C. The District will conduct a fish monitoring program of the habitat before, during and after completion of the pump station replacement project to comply with the District's California Department of Fish and Game (CDF&G) permit.

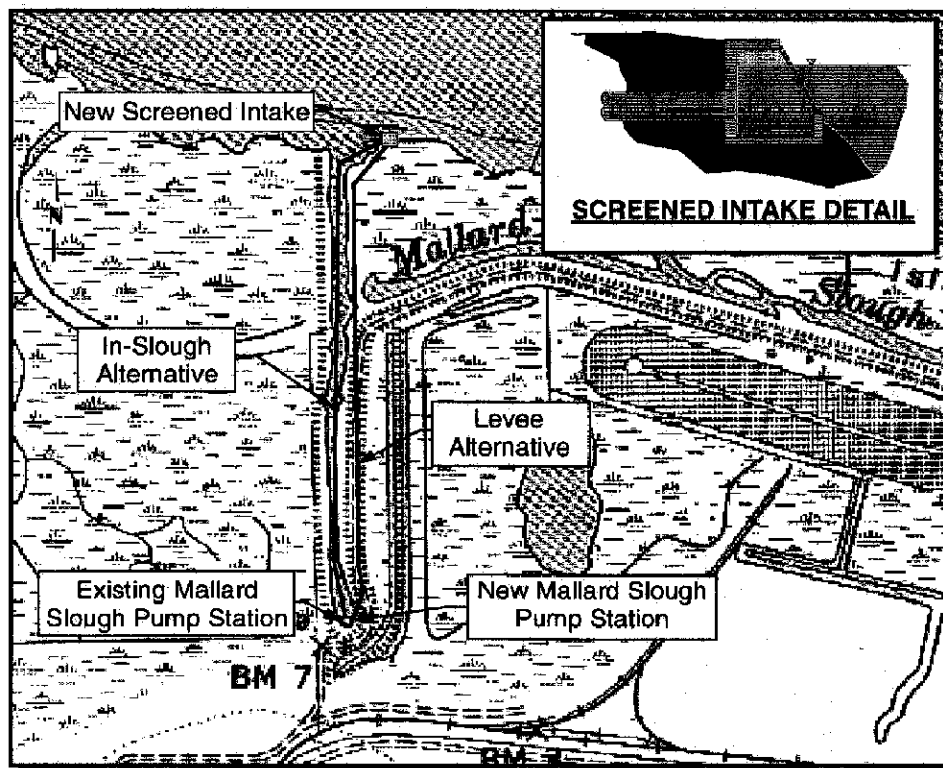
h. Local Support/Coordination with other Programs/ Compatibility with CALFED objectives: Since the Mallard Slough Pump Station Replacement Project will improve the reliability of water service to local area customers after seismic events, the District believes that it will find strong local support for the pump station replacement project. The District also expects that environmental advocates will support the habitat restoration components proposed to supplement the pump station project.

The Mallard Slough Intake Relocation and Habitat Restoration Project will encourage healthy growth of the habitats of the Mallard Slough area while minimizing the impacts of the pump station on threatened species. For these reasons, The District considers this project compatible with all CALFED and Ecosystem Restoration Program Plan (EERP) objectives.

7/23/97



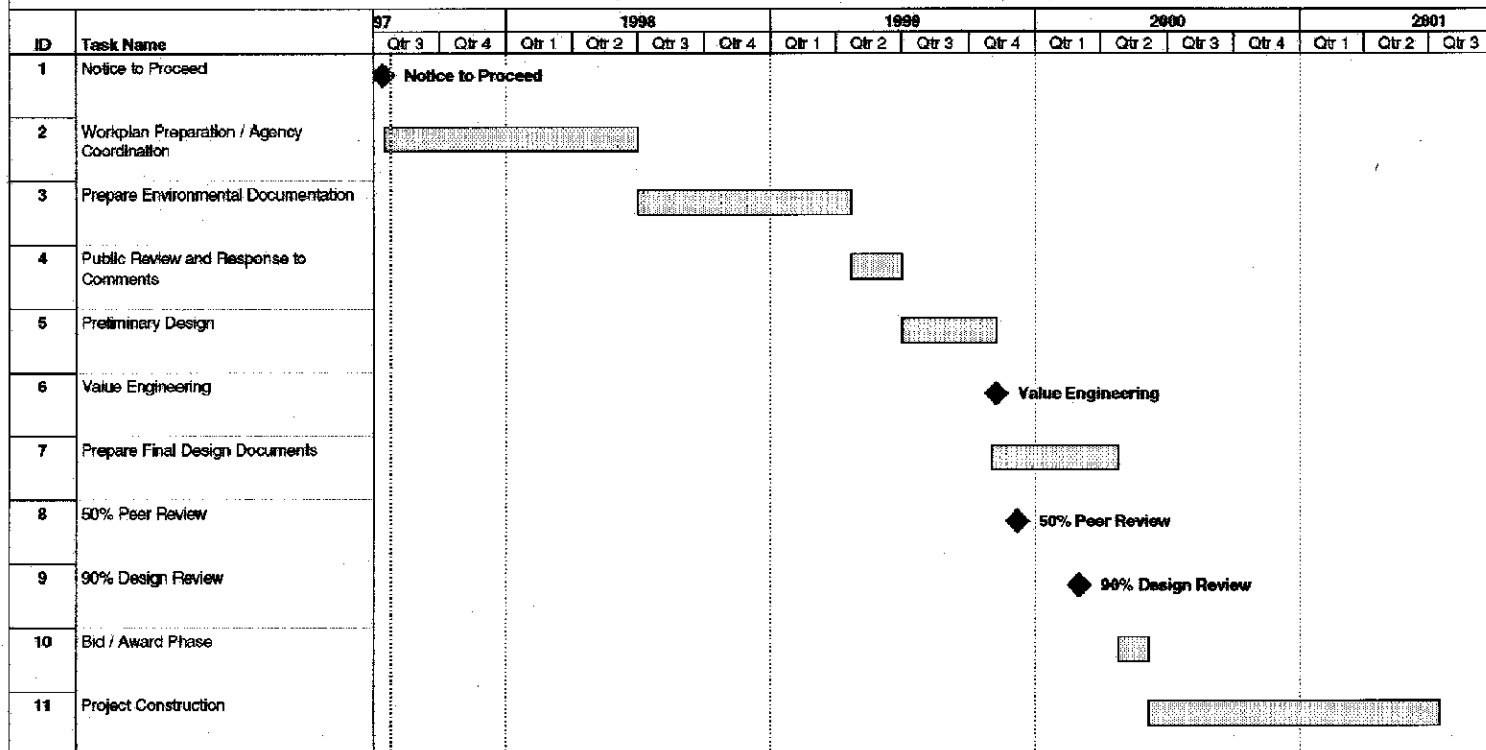
LOCATION MAP



INTAKE PIPELINE ALTERNATIVES

ATTACHMENT A

MALLARD SLOUGH PUMP STATION REPLACEMENT PROJECT SCHEDULE



Fri 7/25/97

ATTACHMENT B

I-007716

I-007716

MALLARD SLOUGH INTAKE CHANNEL
MONITORING PROJECT REPORT
for 1996

Prepared by

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September 16, 1996

ATTACHMENT C

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I-007717

MALLARD SLOUGH INTAKE CHANNEL

MONITORING PROJECT REPORT

for 1996

INTRODUCTION

BACKGROUND:

The United States Bureau of Reclamation (USBR) and the Contra Costa Water District (CCWD) are required under both published Sacramento winter-run chinook salmon and delta smelt biological opinions to minimize the take of these species when diverting Delta waters through the Mallard Slough Pumping Plant. This report presents the a summary of the catch data for 1996.

SITE DESCRIPTION:

The intake channel leading to the Mallard Slough Pumping Plant is a man-made channel connected to the South shore of Suisun Bay due west of Mallard Slough and south of Chipps Island. The channel is approximately 0.5 mile long and 40 to 60 feet wide. Depth varies

from 6 to 10 feet deep along the channel at high tide. The channel entrance is approximately 3 to 4 feet deep at high tide and approximately 1.5 to 2.5 feet deep at low tide. The usual channel depth is too shallow to permit a full sized tow net to open properly, but the egg and larval net frame was small enough to sample the channel. There is a chain link fence across the channel about 100 feet from the pumping plant. Outside the channel mouth the bay is approximately 40 feet deep.

METHODS

A set of townets and egg and larval nets that could be quickly changed were designed to fit an egg and larval net frame. A collar was attached to the frame and the nets were then attached to the collar with a zipper. A flow meter in the mouth of the net measured the amount of water filtered.

Sampling started on April 11, 1996 and ended on July 10. Crew and boat availability permitted sampling twice each month during April and May. Beginning in June sampling was conducted once a

month, as per the contract.

Alternate tows were made between the channel and Suisun Bay and between the egg and larval net and the townet. The first tow was made from the cyclone fence to about 100 feet from the entrance of the intake channel using the egg and larval net. The second tow was a 10 minute bottom to surface oblique tow made in Suisun Bay across the channel entrance against the current using the egg and larval net. The third and fourth tows were made in the channel and bay respectively using the tow net. The cycle was repeated for a total of eight tows on all sampling dates except July 10.

Samples were preserved in 10 percent formalin and processed at the Bay-Delta Division laboratory. Fish were identified to species except for larval cyprinids and centrarchids. Fish counts were converted to number per cubic meter.

T-tests to determine whether fish abundance in the channel was different from the abundance in the bay at the channel mouth were performed for those species taken on 4 or more days during the sampling period. The means of the tows in the channel were compared to the means of the tows in the bay using the procedure for the

paired case.

RESULTS AND DISCUSSION

Thirteen different species were taken (Tables 1 - 13).

Very few delta smelt were taken with the townet. The mean concentration was 34 times higher in the river than in the channel but, not quite significantly so ($p=0.0541$). All delta smelt measured less than or equal to 40 mm.

Longfin smelt were caught by both nets through out the sampling period. Like delta smelt longfin smelt were more abundant in the river than in the channel but the difference was not significant ($p=0.0551$ for the egg and larval net and 0.0998 for the townet). All longfin smelt measured less than or equal to 25 mm.

Striped bass were captured on every sampling date. Bass caught by the egg and larval net were more numerous in the river than in the channel while those caught by the townet were more numerous in the channel.

Threadfin shad were caught in the river by the egg and larval net throughout the sampling period. They did not show up in the

channel in significant numbers until July.

Prickly sculpin were taken throughout the sampling period by the egg and larval net. They were significantly more numerous in the river than in the channel ($p = 0.0373$).

The remaining species were caught sporadically.

The three most abundant species caught in the channel by the egg and larval net were threadfin shad, striped bass and prickly sculpin respectively. The three most abundant species taken in the channel by the ternet were striped bass longfin smelt and threadfin shad. Threadfin shad were not particularly abundant until July 10 when they appeared in large numbers. The three most abundant species captured in the river by the egg and larval net were striped bass, prickly sculpin and longfin smelt. The three most abundant species caught in the river by the ternet were longfin smelt, stripe bass and delta smelt.

The Mallard Slough Intake Channel is probably not diverting large numbers of delta smelt, longfin smelt or striped bass.

Chinook Salmon were not taken. There are two possible explanations: 1) They weren't present or 2) they were able to avoid

the townet. By the time Chinook salmon reach the vicinity of Mallard slough they are smolting and probably moving away from the shore to deeper water. It is also possible that the flow entering the channel is too weak, compared to the flow in the bay, to attract downstream migrant salmon. On the other hand salmon fingerlings are good swimmers and can easily avoid the small mouth of the egg and larval frame that must be used in the channel.

Table 1
1996 MALLARD SLOUGH SUMMARY DATA
for
Delta Smelt

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0458	0.0000	0.0000
May 9	0.0049	0.2014	0.0000	0.0000
May 23	0.0054	0.0639	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0149
July 10	0.0000	0.0387	0.0000	0.0000
Mean	0.0017	0.0582	0.0000	0.0025
t-value	-2.2674			
p	0.0541			

Table 2
1996 MALLARD SLOUGH SUMMARY DATA
for
Longfin smelt

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0586	0.5543	0.0000	0.0000
April 25	0.0000	0.1250	0.0000	0.0000
May 9	0.0046	0.3664	0.0409	0.1256
May 23	0.0000	0.0000	0.0000	0.0149
June 6	0.0000	0.0000	0.0000	0.0099
July 10	0.0000	0.0097	0.0000	0.0104
Mean	0.0105	0.1759	0.0068	0.0268
t-value	-2.2471		-1.6401	
p	0.0551		0.0998	

Table 3
1996 MALLARD SLOUGH SUMMARY DATA
for
Pacific Herring

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0000	0.0000	0.0000	0.0000
May 23	0.0054	0.0000	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0000
July 10	0.0000	0.0000	0.0000	0.0000
Mean	0.0009	0.0000	0.0000	0.0000
t-value				
p				

Table 4
1996 MALLARD SLOUGH SUMMARY DATA
for
Striped Bass

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0249	0.0762	0.0000	0.0000
April 25	0.0000	0.0420	0.0000	0.0000
May 9	0.1385	4.4702	0.0000	0.0000
May 23	0.1606	0.3322	0.0375	0.0375
June 6	0.0577	0.1910	0.0052	0.0050
July 10	0.4550	0.1256	0.2725	0.0208
Mean	0.1395	0.8729	0.0525	0.0043
t-value		-1.0139		
p		0.1786		

Table 5
1996 MALLARD SLOUGH SUMMARY DATA
for
Threadfin Shad

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0038	0.0000	0.0000
May 9	0.0000	0.0000	0.0000	0.0000
May 23	0.0000	0.0314	0.0000	0.0000
June 6	0.0048	0.0000	0.0000	0.0000
July 10	2.5384	0.0097	0.1090	0.0104
Mean	0.4239	0.0075	0.0182	0.0017
t-value		0.9840		
p		0.1988		

Table 6
1996 MALLARD SLOUGH SUMMARY DATA
for
Cyprinidae

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0092	0.0046	0.0000	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0000
July 10	0.0000	0.0000	0.0000	0.0000
Mean	0.0015	0.0008	0.0000	0.0000
t-value				
p				

Table 7
1995 MALLARD SLOUGH SUMMARY DATA
for
Starry Flounder

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0038	0.0000	0.0000
May 9	0.0000	0.0046	0.0000	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0000
July 10	0.0000	0.0000	0.0000	0.0000
Mean	0.0000	0.0014	0.0000	0.0000
t-value				
P				

Table 8
1995 MALLARD SLOUGH SUMMARY DATA
for
Centrarchidae

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0053	0.0044	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0000	0.0046	0.0000	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0000
July 10	0.0838	0.0000	0.0000	0.0000
Mean	0.0149	0.0015	0.0000	0.0000
t-value				
P				

Table 9
1996 MALLARD SLOUGH SUMMARY DATA
for
Inland Silverside

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0000	0.0000	0.0000	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 5	0.0000	0.0000	0.0000	0.0000
July 10	0.0120	0.0000	0.0000	0.0000
Mean	0.0020			
t-value				
P				

Table 10
1996 MALLARD SLOUGH SUMMARY DATA
for
Bigscale Logperch

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0053	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0141	0.0000	0.0000	0.0000
May 23	0.0054	0.0000	0.0054	0.0000
June 5	0.0000	0.0000	0.0000	0.0000
July 10	0.0000	0.0000	0.0000	0.0000
Mean	0.0041		0.0000	
t-value				
P				

Table 11
1996 MALLARD SLOUGH SUMMARY DATA
for
Prickly Sculpin

DATE	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.3392	0.6940	0.0000	0.0000
April 25	0.3054	0.5245	0.0000	0.0000
May 9	0.1085	0.3169	0.0000	0.0000
May 23	0.0528	0.1141	0.0000	0.0000
June 6	0.0143	0.0000	0.0000	0.0000
July 10	0.0120	0.0000	0.0000	0.0000
Mean	0.1387	0.2748	0.0000	0.0000
t-value		-2.2474		
P		0.0373		

Table 12
1996 MALLARD SLOUGH SUMMARY DATA
for
Yellowfin Goby

DATE	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0000	0.0367	0.0051	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 6	0.0000	0.0152	0.0000	0.0000
July 10	0.0120	0.0193	0.0000	0.0000
Mean	0.0020	0.0119	0.0009	0.0000
t-value		-2.2464		
P		0.0769		

Table 13
1996 MALLARD SLOUGH SUMMARY DATA
for
Shimofuri Goby

DATE	NUMBER PER CUBIC METER BY GEAR TYPE AND LOCATION			
	EGG & LARVAL NET		TOWNET	
	CHANNEL	RIVER	CHANNEL	RIVER
April 11	0.0000	0.0000	0.0000	0.0000
April 25	0.0000	0.0000	0.0000	0.0000
May 9	0.0141	0.0046	0.0000	0.0000
May 23	0.0000	0.0000	0.0000	0.0000
June 6	0.0000	0.0000	0.0000	0.0000
July 10	0.0000	0.0000	0.0000	0.0000
Mean	0.0024	0.0008		
t-value				
p				



**CONTRA COSTA
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July 28, 1997

JUL 28 1997

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Subject: 1997 Category III Ecosystem Restoration Projects and Programs Inquiry
Submittal "Mallard Slough Intake Relocation and Habitat Restoration Project"

Gentlemen:

Contra Costa Water District (District) has recently embarked upon a major capital improvement project to replace the 60 year old Mallard Slough Pump Station with a new pumping facility equipped with state-of-the-art fish screens. Being an environmentally-sensitive user of the Bay-Delta, the District has identified \$750,000 to \$2 million in additional improvements that will further enhance the aquatic and wetland habitats in the vicinity of Mallard Slough that is frequented by several threatened species. Although the District is eager to implement these additional improvements (as the Mallard Slough Intake Relocation and Habitat Restoration Project), the District lacks sufficient funding to fully implement both of these significant improvements. Therefore, additional funding is needed.

Following a thorough review of the Request-for-Proposal for the 1997 Category III Ecosystem Restoration Projects and Programs, it is recognized that the Mallard Slough Intake Relocation and Habitat Restoration Project will provide benefits that are essential for achieving the objectives of the CALFED Bay-Delta Program and the goal of the Ecosystem Restoration Program Plan. Therefore, the District has prepared an inquiry submittal to seek the Category III funding for the Mallard Slough Intake Relocation and Habitat Restoration Project.

Please find enclosed ten copies of inquiry submittal for your evaluation. We look forward to working with you and becoming a partner of the CALFED Bay-Delta Program.

Very truly yours,

Walter J. Bishop

WJB:am

Enclosure: 10 copies of Inquiry Submittal